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November 6, 2006  
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U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Mail Station P1-137  
Washington, DC 20555

Reference: Docket No. 50-285

**Subject: Licensee Event Report 2006-003 Revision 0 for the Fort Calhoun Station**

Please find attached Licensee Event Report 2006-003, Revision 0, dated November 6, 2006. This report is being submitted pursuant to 10CFR50.73(a)(2)(i)(B). This letter contains no commitments to the NRC. If you should have any questions, please contact me.

Sincerely,

Jeffrey A. Reinhart  
Site Director  
Fort Calhoun Station

JAR/EPM/epm

Attachment

c: INPO Records Center  
B. S. Mallett, NRC Regional Administrator, Region IV  
J. D. Hanna, NRC Senior Resident Inspector  
A. B. Wang, NRC Project Manager

(See reverse for required number of digits/characters for each block)

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4. TITLE	Technical Specification Violation of Containment Air Coolers Due to Untimely Corrective Actions
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## LICENSEE EVENT REPORT (LER)

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**NARRATIVE** (If more space is required, use additional copies of NRC Form 366A) (17)**BACKGROUND**

Fort Calhoun Station (FCS) has two containment air cooling units (VA-7C and VA-7D) and two containment air cooling and filtering units (VA-3A and VA-3B) as part of the system to control containment air temperatures during normal and accident conditions. The cooling coils for these units are cooled by the component cooling water (CCW) system during normal and accident conditions. The CCW system is a closed loop system cooled by an open loop raw water system. The cooling coils for each unit can be isolated from the CCW system by two inlet and two outlet valves. All four of the isolation valves for each cooling unit are air-operated butterfly valves with backup nitrogen bottle supplies. This group of valves is referred to as the HCV-400 series valves in this discussion.

The containment spray system may be used to control containment temperature during accident conditions if necessary. The containment spray system is a two train system using three pumps connected in parallel.

At the date of this report, FCS Technical Specification 2.4, "Containment Cooling," read as follows:

**(1) Minimum Requirements**

- a. The reactor shall not be made critical, except for low-temperature physics tests, unless all the following are met:
  - i. The following equipment normally associated with diesel-generator DG-1 (4.16-kV bus 1A3 and associated non-automatically transferring 480-Volt bus sections) is operable, except as noted:
    - Raw water pump AC-10A
    - Raw water pump AC-10C
    - Component cooling water pump AC-3A
    - Component cooling water pump AC-3C
    - Containment spray pump SI-3A
    - Containment air cooling and filtering unit VA-3A
    - Containment air cooling unit VA-7C
  - ii. The following equipment normally associated with diesel-generator DG-2 (4.16-kV 1A4 and associated non-automatically transferable 480 Volt bus sections) is operable, except as noted.
    - Raw water pump AC-10B
    - Raw water pump AC-10D
    - Component cooling water pump AC-3B
    - Containment spray pump SI-3B
    - Containment air cooling and filtering unit VA-3B
    - Containment air cooling unit VA-7D
    - Containment spray pump SI-3C

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- iii. Four component cooling heat exchangers shall be operable.
- iv. All valves, piping and interlocks associated with the above components and required to function during accident conditions are operable.

NOTE: Reactor may be made critical with one inoperable raw water pump. LCO action statements shall apply.

- b. During power operation one of the components listed in (1)a.i. and ii. may be inoperable. If the inoperable component is not restored to operability within seven days, the reactor shall be placed in hot shutdown condition within 12 hours. If the inoperable component is not restored to operability within an additional 48 hours, the reactor shall be placed in a cold shutdown condition within 24 hours.
- c. For cases involving Raw Water pump inoperability, if the river water temperature is below 60 degrees Fahrenheit, one Raw Water pump may be inoperable indefinitely without applying any LCO action statement. When the river water temperature is greater than 60 degrees Fahrenheit, an inoperable Raw Water pump shall be restored to operability within 7 days or the reactor shall be placed in a hot shutdown condition within 12 hours. If the inoperable Raw Water pump is not restored to operability within an additional 48 hours, the reactor shall be placed in a cold shutdown condition within 24 hours.

(2) Modification of Minimum Requirements

- a. During power operation, the minimum requirements may be modified to allow a total of two of the components listed in (1)a.i. and ii. to be inoperable at any one time (this does not include one Raw Water pump which may be inoperable as described above if the river water temperature is below 60 degrees Fahrenheit). Only two raw water pumps may be out of service during power operations. If the operability of one of the two components is not restored within 24 hours, the reactor shall be placed in a hot shutdown condition within 12 hours. LCO 2.4(1)b. shall be applied if one of the inoperable components is restored within 24 hours. If the operability of both components is not restored within an additional 48 hours, the reactor shall be placed in a cold shutdown condition within 24 hours.
- b. During power operation one component cooling heat exchanger may be inoperable. If the operability of the heat exchanger is not restored within 14 days, the reactor shall be placed in a hot shutdown condition within 12 hours. If two component cooling heat exchangers are inoperable, the reactor shall be placed in hot shutdown condition within 12 hours. If the inoperable heat exchanger(s) is not restored to operability within an additional 48 hours, the reactor shall be placed in a cold shutdown condition within 24 hours.
- c. Any valves, interlocks and piping directly associated with one of the above components and required to function during accident conditions shall be deemed to be part of that component and shall meet the same requirements as for that component.
- d. Any valve, interlock or piping associated with the containment cooling system which is not included in the above paragraph and which is required to function during accident conditions may be inoperable for a period of no more than 24 hours. If operability is not restored within 24 hours, the reactor shall be placed in a hot shutdown condition within 12 hours.

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## EVENT DESCRIPTION

On June 29, 2006 station personnel identified torn pneumatic actuator piston rod dust boots (indicating possible actuator leaks) on valves HCV-400B and HCV-401A, CCW inlet valves to the containment air cooling and filtering units VA-3A and VA-3B. This was documented by generating Condition Reports (CRs) 200602757 and 200602759. The valves were determined to be operable by the Shift Manager after having the valves cycled from the Control Room. The determination that valves HCV-400B and 401A were operable in the reported condition was subsequently found to be incorrect. CR 200603808 was written to address this issue.

A related but separate issue occurred on July 18, 2006, when an operability evaluation was performed under CR 200603019 for five of the HCV-400 series CCW inlet valves to the containment air cooling and filtering units and the containment air cooling units. This evaluation incorrectly concluded that the valves were operable with the as-found leakage of the backup nitrogen bottle regulators. CR 200603071 was written on July 20, 2006 when it was determined there was a possible conflict between the operability evaluation written for CR 200603019 and an operability evaluation prepared for previous CR 200401672. CR 200603765 was written to track a reportability review for the issue.

## Timeline

**Date**      **Event Description**

- |           |  |
|-----------|--|
| 5/7/2004  | CR 200401672 was written to document Operating Experience information from San Onofre Nuclear Generating Station regarding hydrodynamic torque on valves similar to HCV-400 series valves at FCS. (This CR references CR 200401628 involving a ruptured dust boot due to air leakage.) Actions to review and appropriately update station documents were assigned.   |
| 6/25/2004 | An FCS design engineer issued Action Request 35292 to himself to track update of the appropriate Design Basis Document (DBD) and other station documents to reflect new information regarding operation of the valves.   |
| 8/11/2004 | NRC integrated inspection report 05000285/2004003 documented a green non-cited violation regarding flow induced hydrodynamic torque phenomena resulting in HCV-400 series valve inoperability.   |
| 6/29/2006 | CR 200602757 noted that that the dust boot on HCV-400B was torn.   |
| 6/29/2006 | CR 200602759 noted that that the dust boot for HCV-401A was torn.  |
| 7/12/2006 | The FCS System Engineering Manager discussed with the First Response Engineer recent status of the CCW system; this discussion noted a concern regarding the operability of the HCV-400 series valves based on the issues identified in CR 200401672. System Engineering personnel questioned the operability determinations for CR 200602757 and CR 200602759, which had concluded that the valves were operable. After discussing the issue further with the Shift Manager, the decision was made that the valves were inoperable, and the operability determinations for CR 200602757 and CR 200602759 were revised accordingly. CR 200602911 was generated to document the changing of the operability determinations. |

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- 7/18/2006 CR 200603019 was written to document nitrogen regulator leaks for the HCV-400 series valves. The operability evaluation concluded that the associated valves were operable based on DBD information. It was later determined that the conclusion of the operability determination was incorrect.
- 9/1/2006 CR 200603765 was written to document a reportability concern regarding CR 200603019 on nitrogen regulators associated with the HCV-400 series valves.

On September 5, 2006, CR 200603808 was written to document that the error in the operability determination made on 6/29/2006 regarding HCV-400B (and the eventual discovery of this error on 7/12/2006) resulted in a violation of TS 2.4.1.b and is reportable under 10 CFR 50.73(a)(2)(i)(B).

## CONCLUSION

CR 200401672 documented operating experience, from another plant, where flow induced hydrodynamic torque caused butterfly valves to change valve position when pneumatic pressure was lost to the valve operator. CR 200401672 had several action items to look for the extent of condition, but did not include an action item to identify and update design basis documents, procedures or other documents useful for assessing operability of the HCV-400 series valves when pneumatic pressure is lost. An action to update these documents was being tracked as an assignment in the separate work management system. A corrective action in the corrective action system to update the documents impacted by CR 200401672 would have received the appropriate managerial oversight to ensure that action was taken within an appropriate time frame, thereby providing greater assurance that the design documents and other related technical/operational information required to make correct operational decisions on these valves would be corrected in a timely manner. Correct design and engineering documents coupled with updated appropriate procedures would have provided Operations and System Engineering personnel with the proper tools necessary to make the correct operability determination.

The root cause of both of the above described events is the failure to assign proper (and timely) corrective actions to address the need for updating design basis and procedural guidance related to the HCV-400 series valves. The potential exists for other corrective actions to be tracked under the work management system rather than the corrective action system as required.

## CORRECTIVE ACTIONS

The HCV-400 series valves have been inspected and repaired to return the valves to an operable status.

Changes to appropriate station documents (as documented in CRs 200603808 and 200603765) will be completed by March 2, 2007.

Engineering will review the work management system for corrective actions related to CRs and create appropriate action items in the corrective action system for those that are not currently there. This review will be completed by December 31, 2006.

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## SAFETY SIGNIFICANCE

The hydrogen generation in containment section of the FCS design analysis credits operation of the containment air coolers for 30 days following a design basis event. However, based on revised regulatory requirements in 10 CFR 50.44 (Standards for Combustible Gas Control Systems), the generation of explosive amounts of hydrogen in a (dry large) containment building (FCS) is not considered to be a risk significant event and the evaluation of this event is no longer required.

Following a loss of coolant accident when the supply of make-up water from the normal source is complete, the emergency core cooling system (ECCS) pump suction is automatically aligned to the containment sump. Station documents refer to this realignment signal as the recirculation actuation signal (RAS).

The containment air coolers are not credited post-RAS for heat removal. Therefore, a loss of containment air cooling post-RAS (which occurs approximately 1/2 to 1 hour after a large break loss of coolant accident event initiation) has no effect on radiological consequences analyses. A review of station corrective action documentation was performed to ascertain the potential backup nitrogen leakage rate for the affected valves. Following the review of leakage rate and the sizes of the attached backup nitrogen bottles, Engineering has determined that the affected valves should maintain their accident positions for at least 2 hours.

Therefore, this event had minimal impact on the health and safety of the public.

## SAFETY SYSTEM FUNCTIONAL FAILURE

This event does result in a safety system functional failure in accordance with Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline".

## PREVIOUS SIMILAR EVENTS

No previous LERs have documented inadequate operability determinations on valves caused by inadequate corrective action to a previous condition.